

Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

536, 725  
PCT/EP2003/013434



27 MAY 2005

Applicant's or agent's file reference JA 419-02WO	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
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Applicant FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 17 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of \_\_\_\_\_ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 04 May 2004 (04.05.2004)	Date of completion of this report 10 June 2005 (10.06.2005)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP2003/013434

## I. Basis of the report

1. This report has been drawn on the basis of (Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.):

- ☐ the international application as originally filed.
- ☒ the description, pages 1-42, as originally filed,  
 pages \_\_\_\_\_, filed with the demand,  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_.
- ☒ the claims, Nos. 1-40, as originally filed,  
 Nos. \_\_\_\_\_, as amended under Article 19,  
 Nos. \_\_\_\_\_, filed with the demand,  
 Nos. \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
 Nos. \_\_\_\_\_, filed with the letter of \_\_\_\_\_.
- ☒ the drawings, sheets/fig 1-17, as originally filed,  
 sheets/fig \_\_\_\_\_, filed with the demand,  
 sheets/fig \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
 sheets/fig \_\_\_\_\_, filed with the letter of \_\_\_\_\_.

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/fig \_\_\_\_\_

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

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IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☒ paid additional fees.
- ☐ paid additional fees under protest.
- ☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
- ☐ not complied with for the following reasons:

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☒ all parts.
- ☐ the parts relating to claims Nos. \_\_\_\_\_

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP 03/13434

**I. Basis of the report**

1. This report has been drawn on the basis of *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

The examination is based on the following parts of the application:

**Description:**

pages 1-42 as originally filed;

**Claims:**

claims 1-40 as originally filed;

**Drawings:**

figures 1-17 as originally filed.

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Box IV.

**Lack of unity of invention**

This Authority has determined that the present international application contains multiple inventions or groups of inventions which are not linked by a single general inventive concept (PCT Rule 13.1), as follows:

Group I (invention I):

**Claims 1-18:** method for machining a wafer and a corresponding device.

Group II (invention II):

**Claims 19-40:** wafer with a support layer and a plasma polymer separating layer disposed between the support layer and the wafer, and a method for producing the wafer.

The reasons are as follows:

The search showed the following prior art to be relevant to the assessment of unity of invention:

**D1:** abstract of JP-A-07106285 & JP-A-07106285.

Document D1 discloses (see figures 2(a) to 2(e) and paragraphs [18] to [23]) a method for machining a wafer, said method anticipating the novelty of **claims 1, 3, 5-9, 15 and 17** (PCT Article 33(2)).

A comparison of the current groups of claims with the stated document shows that the following features make a contribution to the prior art and

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Box IV.

can therefore be regarded as special technical features pursuant to PCT Rule 13.2:

Group I: the thinned rear side of the wafer is coated;

Group II: the separating layer is a plasma polymer layer.

These special technical features are different and therefore there is no technical relationship between the subjects of the above-mentioned two groups of claims involving one or more of the same or corresponding special technical features (PCT Rule 13.2).

The following problems can be considered to be solved by the special technical features of groups I and II:

Group I: protecting the rear side and/or forming electrical contacts;

Group II: simplifying and automating the production of the separating layer and influencing the adhesion properties thereof.

These problems are different or are known from the prior art (see above).

Furthermore, when examining the question of whether possibly common special technical features exist by virtue of an equivalent technical effect it should be noted that:

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Box IV.

- the technical effect of the first group consists in improving the contact properties of the wafer (e.g. ohmic contact in the case of rear-side metallisation, which is the only example provided);
- the technical effect of the second group is regarded as the greater level of thermal conductivity and the residue-free removal of the separating layer from the wafer.

This shows that there is no equivalent corresponding technical effect. Consequently, neither on the basis of the problems addressed by each invention, nor on the basis of the solutions thereto defined by the special technical features of each invention can a technical relationship be established between the inventions that results in a single general inventive concept.

Consequently, the stated groups of claims do not satisfy the requirement for unity of invention (PCT Rule 13.1 and 13.2) either with respect to the special technical features of the claims or to the problems solved.

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Claims	12, 13, 16, 18, 24, 28, 32-35, 37, 40	YES
	Claims	1-11, 14, 15, 17, 19-23, 25-27, 29-31, 36, 38, 39	NO
Inventive step (IS)	Claims	1, 3, 7-9, 15, 17, 19-22, 25, 27, 31-35	YES
	Claims	2, 4-6, 10-14, 16, 18, 23, 24, 26, 28-30, 36-40	NO
Industrial applicability (IA)	Claims	1-40	YES
	Claims		NO

**2. Citations and explanations**

Reference is made to the following documents:

D1: Abstract of JP-A-07106285 & JP-A-07106285

D2: US-A-5268065

D3: WO-A-99/48137

D4: FR-A-2823012

D5: Abstract of JP-A-05343376 & JP-A-05343376

D6: EP-A-981156

**1 Lack of novelty****1.1 Lack of novelty - invention 1:**

The present application does not meet the requirements of PCT Article 33(1) because the subject matter of **claims 1-11, 14, 15 and 17** lacks novelty (PCT Article 33(2)).

- 1.1.1 Document D1 discloses (figures 2(a) to 2(e) and paragraphs [18] to [23]) a method for machining a wafer that has components on the front side (VS), comprising the following steps:**
- applying a layer system (SS) (11, 4) to the VS of the wafer (1), the SS comprising at least one



separating layer (11) (TNS) that contacts the VS of the wafer and a support layer (4) (TGS) (see figures 2(c) and (d));

- thinning the rear side (RS) of the wafer (see figure 2(d)) in such a way that the layer system protects or supports the wafer or parts of the wafer during thinning,

and therefore the subject matter of **claim 1** lacks novelty (PCT Article 33(2)).

D1 also discloses:

- a step for dividing the wafer (see figure 2(d)), the SS protecting and supporting the wafer during division (feature of **claim 3**);
- before the SS is finished, the wafer is structured by scratching (see figures 2(a) and (b)) so that the structures (23) formed open up during thinning of the RS and divide the wafer (features of **claim 5**);
- grinding is used to thin the RS and divide the wafer; see paragraph [20] (features of **claims 6 and 15**);
- figure 2(e) and paragraphs [14], [15] and [21] show a step in which the bonding of the SS to the wafer is reduced by a mechanical action (e.g. by means of pressure from the "picker" (6)) and then the TNS (11) is mechanically (by means of the "picker" (6) and the use of a vacuum (10)) removed from the wafer (features of **claims 7, 8 and 9**). It is also clear from the drawing that the SS is applied such that the TNS (11) adheres more strongly to the TGS than to the front side of the wafer (features of **claim 17**).

Consequently, in view of document D1, the subject matter of **claims 1, 3, 5-9, 15 and 17** lacks novelty (PCT Article 33(2)).

1.1.2 Document D2 discloses (figures 1-5, column 2, line 56 to column 3, line 67; column 4, lines 27-35; column 5, lines 3-11 ; column 5, line 47 to column 6, line 29) a method for machining a wafer that has components on the front side (VS), comprising the following steps:

- applying an SS (15) to the VS (12) of the wafer (11), the SS comprising at least one TNS that contacts the VS of the wafer and a TGS (see column 3, lines 14-35, "contact layer" as TNS and "support film" as TGS);
- thinning the rear side of the wafer (see figure 3) in such a way that the layer system protects or supports the wafer or parts of the wafer during thinning,

and therefore the subject matter of **claim 1** lacks novelty (PCT Article 33(2)).

D2 also discloses the following features:

- in column 5, lines 54-66 and figure 4, the thinned rear side of the wafer is coated (features of **claim 2**);
- the rear side of the thinned wafer is smoothed by etching so that the mechanical properties of the wafer change; see claims 4 and 5 and column 5, lines 47-51 (features of **claim 4**);
- in figure 5 and column 6, lines 9-16, the bonding of the SS to the wafer is reduced by a mechanical action (21) so as to then mechanically remove the TNS from the wafer (features of **claims 7, 8 and 9**). It is also

- clear from the drawing (and also from the wording of claim 1 of D2; see "separating" layer) that the SS is applied such that the TNS adheres more strongly to the TGS than to the front side of the wafer (features of **claim 17**);
- the rear side of the wafer is thinned by grinding, lapping or chemical etching; see column 4, lines 30 to 34 (features of **claim 15**).

Consequently, in view of document D2, the subject matter of **claims 1, 2, 4, 7-9, 15 and 17** lacks novelty (PCT Article 33(2)).

1.1.3 Document D3 discloses (figures 2b and 2c; page 4, lines 4-13; page 7, line 15 to page 8, line 18; page 8, line 36 to page 9, line 16; and claims 1-15) a method for machining a wafer that has components on the VS, comprising the following steps:

- applying a layer system (SS) (2, 4) to the VS (1a) of the wafer (1), the SS comprising at least one TNS (2) that contacts the VS of the wafer and a TGS (4) (see figure 2a; page 4, lines 4-13 and page 7, lines 26-28);
- thinning the rear side of the wafer (see figure 2b and page 7, lines 28-31) by means of grinding, lapping or etching in such a way that the layer system protects or supports the wafer or parts of the wafer during thinning (features of **claim 15**);
- the rear side of the thinned wafer is smoothed so that the mechanical properties of the wafer change (chemical machining); see page 8, lines 1 and 2 and claim 8 (features of **claim 4**);
- dividing the wafer (see figure 2c), for example using a laser, the SS protecting and supporting

the wafer during division; see claims 2 and 3 and page 8, lines 4-9 (features of claims 3 and 6).

In addition, according to page 8, lines 11-15, page 9, lines 11-16, and claims 10 and 11, the bonding of the SS is reduced and the TNS is separated (e.g. mechanically) from the wafer (features of claims 7, 8 and 9) and the rear side of the wafer is thinned by grinding (features of claim 15).

Consequently, in view of document D3, the subject matter of claims 1, 3, 4, 6-9 and 15 lacks novelty (PCT Article 33(2)).

- 1.1.4 Document D4 discloses (figures 1A to 1J; page 11, line 24 to page 12, line 9; page 12, line 25 to page 13, line 18; page 17, lines 12-23; page 18, line 16 to page 20, line 31; page 21, lines 10-24) a method for machining a wafer that has components on the front side (VS), comprising the following steps:
- applying an SS to the VS of the wafer (10, 12), the SS comprising at least one TNS (13) ("couche d'adhésion" in D4) that contacts the VS of the wafer and a TGS (14) ("support de transfert" in D4) (see figures 1A to 1C and page 19, lines 1-17);
  - thinning the rear side of the wafer by means of grinding, lapping or etching (see figure 1D and page 19, lines 18-24) in such a way that the layer system protects or supports the wafer or parts of the wafer during thinning (features of claim 15);
  - applying to the side of the TGS facing away from

- the wafer a film or material mass layer as per **claim 14** (see figure 1E; page 14, lines 17-25 and page 19, line 30 to page 20, line 2; and claim 17);
- dividing the wafer (see figures 1F and 1G; page 13, lines 15-18 and page 20, lines 2-12), for example using a laser or by cutting or etching, the SS (13, 14) protecting and supporting the wafer during division and not being cut through (features of **claims 3 and 6**);
  - in figures 1I and 1J and on page 21, lines 17-24, the bonding to the wafer of the SS layer on the side next to the wafer is reduced by a chemical action (features of **claims 7 and 8**); the mechanical removal of the separating layer from parts of the wafer is shown on page 14, lines 3-10 and in claims 15 and 16 (feature of **claim 9**);
  - the TNS (13) may be, for example,  $\text{SiO}_2$  applied by CVD; see page 13, lines 1-3; page 17, lines 17-23; and page 19, lines 1-7 (feature of **claim 10**);
  - the TGS may consist of a plastics mass (see page 11, lines 1-7) (feature of **claim 11**).

Consequently, in view of document D4, the subject matter of **claims 1, 3, 6-11, 14 and 15** lacks novelty (PCT Article 33(2)).

Since the applicant paid the requisite fees for preliminary examination of both inventions in good time, this International Preliminary Report covers all claims.

**1.2 Lack of novelty - invention 2:**

The present application does not meet the requirements of PCT Article 33(1) because the subject matter of **claims 19-23, 25-27, 29-31, 36, 38 and 39** lacks novelty (PCT Article 33(2)).

**1.2.1** Document D5 describes (see the abstract, paragraphs [17] to [27] and figure 2a) an assembly consisting of a silicon wafer (3) with electronic components, a separating layer (TNS) (11, 12) being disposed on the front side thereof and being covered by a support layer (TGS) (6). According to paragraph [26], if a quartz plate is used as TGS (6), the additional layers (11) (shown in figure 2b between (12) and (6)) may be dispensed with.

The TNS comprises two zones (of different material), shown as layers (1, 12), the first (11) consisting of phosphosilicate glass (polymer) and the second (12) of SOG (polymer) (see also the last sentence under point 3.2.2).

As can be seen from figure 2c, the TNS is separated on the wafer-side in a substantially residue-free manner, which points to the TNS being more strongly attached to the TGS than to the wafer. It is clear that the two TNS layers form an adhesive zone (12) next to the TGS and a dehesive zone (11) next to the wafer (this TNS corresponds to a gradient layer with different zones).

The features of **claims 19-22 and 25** thus lack novelty.

The wafer from figure 2a is formed by the method from figures 1a to 1d, which anticipates the features of **claims 29 and 30**. The TNS (12) consists of PSG and is deposited by means of CVD (see paragraph [18] of D5), the term "CVD" including plasma steps (PECVD).

The TNS is produced by altering the deposition conditions surrounding the aforementioned adhesive zone (11) and "adhesive zone (12) (of different materials) (features of **claim 31**).

The front side of the wafer is structured in figure 1a, as preparation for a subsequent separation into individual elements, and then in figure 2b the wafer is thinned from the rear side. Following thinning the TNS and the TGS are separated according to figure 2c (by means of etching, as also proposed on page 24, lines 18-20 of the application (features of **claims 36, 38 and 39**).

Consequently, in view of document D5, the subject matter of **claims 19-22, 25, 29-31, 36, 38 and 39** lacks novelty (PCT Article 33(2)).

- 1.2.2 Document D6 describes (see page 3, lines 18-36; page 4, lines 9-53; page 5, lines 13-30; and figures 1-5) an assembly consisting of a silicon wafer (3) with electronic components (see page 2, lines 43-45), a TNS (2) being disposed on the front side thereof and being covered by a support layer (TGS) (1), said TNS adhering more strongly to the TGS than to the wafer (see figure 5).

The TNS consists of a polymer layer (see page 4, lines 9-53), comprises as an integral component a formerly fluid precursor (see page 6, example 1, "ethyl acetate solution") and can be mechanically removed and separated from the wafer in a substantially residue-free manner, as can be seen from figure 5.

The TGS (1) also consists of a polymer material; see page 3, lines 21-27. Consequently, in view of document D6, the subject matter of **claims 19-21, 23 and 25-27** lacks novelty (PCT Article 33(2)).

## **2 Lack of inventive step**

### **2.1 Lack of inventive step - invention 1:**

The present application does not meet the requirements of PCT Article 33(1) because the subject matter of **claims 2, 4-6, 10-14, 16 and 18** does not involve an inventive step (PCT Article 33(3)).

**2.1.1** The implementation in the method from D1 of the steps proposed in **claims 2 and 4** (e.g. rear-side coating and smoothing) cannot be considered inventive, since those steps have already been used for the same purpose in the similar methods from D2 and D3 and are therefore common (see points 1.1.2 and 1.1.3 above).

The same applies to the hardening of the support layer according to **claim 13**, which a person skilled in the art would routinely do when using a material for the support layer that is too soft.



It is therefore easy for a person skilled in the art to apply these known features to the method from D1 to like effect and in this way to arrive at a method as per **claims 2, 4, 13 and 16**, without thereby being inventive (claim 16 consists merely of a combination of the features of claims 1, 2, 3, 4, 9 and 13).

Documents **D2, D3 and D4** are considered to be equivalent to D1 and could (proceeding from each) also be referred to for this assessment of the prior art.

**2.1.2** The device as per **claim 18** consists merely of a list of the means (e.g. installations) that are necessary for carrying out all the steps of the method from claims 1-3, 5, 7 and 9. As mentioned under points 1.1.1 and 1.1.2 above, such a method is known or is obvious.

A method can, however, only be carried out if the corresponding device is available. If the method is known or obvious, then the corresponding device is also necessarily so (see, for example, **D3**, page 9, line 35 to page 10, line 14; the last paragraph on page 11 and page 12), and therefore the subject matter of **claim 18** does not involve an inventive step (PCT Article 33(3)).

(This applies in respect of each of documents D1 to D4).

**2.1.3** The remaining dependent claims, **claims 10-12 and 14**, do not contain any additional features which, in combination with the features of any claim to which they refer and in view of **D1**, meet the PCT requirements for inventive step. The reasons are as

follows:

- regarding the choice of material for the TNS and the TGS and the application thereof, a person skilled in the art is aware that the alternatives from **claims 10, 11 and 12** have already been used for the same purpose in a similar method (see document **D4**, in particular page 10, line 17 to page 11, line 9; page 12, line 25 to page 13, line 4; page 17, lines 17-23; page 19, lines 1-7 and claim 5), are equivalent to the relevant features of claim 1 and can be replaced therewith if necessary. Consequently, the features of claims 10, 11 and 12 are merely some of the many obvious possibilities from which a person skilled in the art would choose according to the circumstances in order to solve the problem of interest, without thereby being inventive;
- strengthening or stabilising of the layer system using an additional film or material mass as per **claim 14** is known from **D4**, page 14, lines 17-25 and page 19, line 30 to page 20, line 2. If a person skilled in the art wished to achieve the same aim in the method from **D1**, he could easily apply these features to like effect to the method of **D1** and in this way arrive at a method as per claim 14 without thereby being inventive.

2.1.4 For the same reasons as mentioned under point 2.1.3, the remaining dependent claims do not contain any additional features which, in combination with the features of any claim to which they refer and in view of documents **D2, D3 and D4**, meet the PCT requirements for inventive step:

- in view of D2, dependent claims 5, 6, 10-12 and 14 do not contain any additional features which, in combination with the features of any claim to which they refer, meet the PCT requirements for inventive step;
- in view of D3, dependent claims 5, 10-12 and 14 do not contain any additional features which, in combination with the features of any claim to which they refer, meet the PCT requirements for inventive step;
- in view of D4, dependent claims 5 and 12 do not contain any additional features which, in combination with the features of any claim to which they refer, meet the PCT requirements for inventive step.

## 2.2 Lack of unity of invention - invention 2:

The present application does not meet the requirements of PCT Article 33(1) because the subject matter of claims 23, 24, 26, 28-30 and 36-40 does not involve an inventive step (PCT Article 33(3)).

2.2.1 Prior art document D6 shows a method for producing an assembly comprising a wafer (3), a TGS (1) and a TNS between the TGS and the wafer, the method comprising the following steps:

- a) preparing a wafer (3);
- b) providing the wafer with a TNS (2) so that the TNS adheres to the wafer;
- c) applying a TGS (1) to the TNS so that the TNS adheres more strongly to the TGS than to the wafer (see figure 5).

The subject matter of **claim 29** thus differs from the method known from **D6** in that the TNS is plasma-deposited. The present invention can therefore be considered to address the problem of forming an adhesive layer on an Si wafer.

According to page 3, lines 32 and 33 ("dry laminate") and page 4, lines 9 and 10 of **D6**, the TNS in **D6** can be produced using any desired (wet or dry) method provided that the conditions specified in paragraph [24] ("elastic modulus") are satisfied.

The use of plasma deposition for polymer separating layers in similar methods is, however, generally, known; see **D5** (see point 1.2.1 above) or **D4** (see page 12, line 25 to page 13, line 14, the PECVD-deposited polymer TNS 13 of figure 1B) and therefore a person skilled in the art would obviously consider a PECVD step in **D6** and would thus arrive at a method as per **claims 29 and 30**, without thereby being inventive.

The front side of the wafer is structured in figure 2 (as preparation for the subsequent separation into individual elements), the wafer is then thinned from the rear side and is separated into individual elements (see figure 4) and the TNS and the TGS are removed in figure 5 (features of **claims 36, 38-40**).

Consequently, the subject matter of **claims 29, 30, 36 and 38-40** is not inventive in view of document **D6** and general prior art (PCT Article 33(3)).

**2.2.2** Regarding the remaining dependent claims:

- the use of a fluid precursor during the CVD of a PSG layer as in **D5** is common (feature of **claim 23**). A PSG layer can be mechanically removed from an Si wafer (feature of **claim 26**);
- thinning of the wafer from the rear side (figure 2b of **D5**) could be carried out in **D5** without an inventive step being exercised if separation of the wafer into individual components were required; see, for example, **D6**, figure 4 (feature of **claim 40**);
- the use of a TNS (and also of a TGS) with the highest possible degree of thermal conductivity and good adhesive properties under thermal stress (**claims 24 and 28**) is obvious for the clear reason of wanting to protecting the wafer from undesirable thermal damage. A person skilled in the art would therefore choose materials with such properties for the TNS in **D5** or **D6** according to the circumstances and without thereby being inventive;
- the implementation of the steps proposed in **claim 37** (e.g. rear-side coating) in the methods from **D5** or **D6** cannot be considered inventive, since those steps have already been used for the same purpose in the similar method known from **D2** and are considered to be common; see **D2**, column 5, lines 54-57 and the metal layer 18 in figure 4.

Consequently, the subject matter of **claims 23, 24, 26, 28, 37 and 40** is not inventive in view of **D5** and general prior art (PCT Article 33(3)).

The subject matter of **claims 24, 28 and 37** is not inventive in view of D6 and general prior art (PCT Article 33(3)).

**3 Observations:**

Some of the claims have been interpreted taking into consideration the following observations.

**3.1 Observations - invention 1:**

Some of the features in device claim 18 refer to a method for using the device and not to the definition of the device in terms of its technical features (installations). Therefore, contrary to PCT Article 6, the intended limitations are not clear from the claim. In addition, "means for thinning the rear side of a wafer", for example, is understood to mean simply any means that is suitable for thinning the rear side of a wafer.

**Claim 18** was therefore interpreted in line with page 21 (lines 5-15) of the description (only installation features).

**3.2 Observations - invention 2:**

**3.2.1** It would appear from the description (page 22, lines 1-5 and figures 1 and 2 and page 32, lines 11-15) that the following feature is essential to the definition of the invention:

- the separating layer is disposed on the front side of the wafer (see also claims 21 and 30).

Since independent claims 19 and 29 do not contain this feature, they do not meet the requirement of PCT Article 6 in conjunction with PCT Rule 6.3(b) that each independent claim must include all the technical features that are essential to the definition of the invention.

3.2.2 In addition, claim 19 does not meet the requirements of PCT Article 6 because the subject matter for which protection is sought is not clearly defined. An attempt is made in claim 19 to define an object (the separating layer) in terms of the method for the production thereof ("plasma"). A claim directed to an object must be defined in terms of object features instead of method features (e.g. "polymer layer" instead of plasma polymer layer").

The description creates the impression that the "plasma polymer" separating layer is an SiO<sub>2</sub> layer that is deposited using a plasma consisting of HMDSO and oxygen and that no alternatives to these parameters are provided (see tables 1 and 2). Therefore, contrary to PCT Article 6, claim 29 is not supported by the description.

Under points 1.2.1 and 1.2.2 above, the feature "plasma polymer layer" in claim 19 was interpreted as "polymer layer".

3.2.3 In claims 19 and 29, the separating layer is claimed as a "plasma polymer layer" which adheres more strongly to the support layer than to the wafer. This type of functional indication does not allow a person skilled in the art to determine what technical features are necessary for carrying out

the stated function. It is clear that not just any "plasma polymer" is able to produce the desired adhesion properties.

The description indicates that a lower level of adhesion is desired between the TNS and the wafer surface, this being achieved using a dehesive zone according to **claims 22 and 31**. The features of **claims 22 and 31** are therefore technical features which are essential to the clarity of **claims 19 and 29** (PCT Article 6 in conjunction with PCT Rule 6.3(b)).

Regarding the forming of the dehesive zone of **claims 22 and 31**, the description shows that this zone can be produced using special means only (and that no alternatives to those means are provided), namely in that the wafer surface is cross-linked with a fluid precursor before the plasma step (silicon oil or polydimethylsiloxane; see page 34, lines 1 to 26 and page 40, lines 18-26), said precursor acting as an active separating substance and after the plasma step being part of the TNS. This corresponds to the features of **claims 32, 33 and 35**, which are considered to be missing necessary technical features that are essential to the clarity of **claims 22 and 31**.

**3.2.4 Claims 24 and 33** do not meet the requirements of PCT Article 6 because the subject matter for which protection is sought is not clearly defined. The claims attempt to define the subject matter in terms of the result to be achieved (bonding of the TNS to the wafer at temperatures of up to 400°C, an active separating substance), but in so doing merely state



the problems to be solved, without providing the technical features necessary for achieving this result (e.g.: which materials can be considered, what parameters are required to achieve the result?). The only example of the TNS in the description (see pages 40-42) is of an SiO<sub>2</sub> layer deposited by PECVD using HMDSO (organic precursor). The fluid precursor as an active separating substance is mentioned on page 34, lines 1-26 and page 40, lines 18-26. These features would render claims 24 and 33 clear.

3.2.5 Claim 40 is not clear and does not meet the requirements of PCT Article 6 because the subject matter for which protection is sought is not clearly defined, since it does not allow a person skilled in the art to determine what technical features are necessary for separating the wafer with the exception of the rear-side metallisation into individual elements by thinning or removing the TNS and TGS; when thinning (from the rear side), the rear-side metallisation must be removed.

3.2.6 The combinations of features contained in dependent claims 31, 32, 33 and 35 are neither disclosed nor suggested by the available prior art.